

Office Action Summary

Application No.

08/303,561

Applicant(s)

Bednorz et al.

Examiner

Douglas J. McGinty

Group Art Unit

1105☒ Responsive to communication(s) filed on April 11, 1996, January 3, 1996, and September 29, 1995.☐ This action is **FINAL**.☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims☒ Claim(s) 24-26, 86-90, and 96-108 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.☒ Claim(s) 24-26, 86-90, and 96-108 is/are rejected.☐ Claim(s) _____ is/are objected to.☐ Claims _____ are subject to restriction or election requirement.**Application Papers**☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.☐ The drawing(s) filed on _____ is/are objected to by the Examiner.☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.☐ The specification is objected to by the Examiner.☐ The oath or declaration is objected to by the Examiner.**Priority under 35 U.S.C. § 119**☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.☒ received in Application No. (Series Code/Serial Number) 08/053,307.☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).**Attachment(s)**☐ Notice of References Cited, PTO-892☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____☐ Interview Summary, PTO-413☐ Notice of Draftsperson's Patent Drawing Review, PTO-948☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 1105

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. The rejections and objections, if any, from the previous Office Action have been withdrawn if not repeated in this Office Action.

2. It is requested that this Examiner be notified of all pending, related applications. See MPEP 2001.06(b). That notice need not be in a PTO form - 1449, however. See MPEP 901.03.

Priority

3. Acknowledgment is made of applicant's claim for priority under 35 U.S.C. § 119. The certified copy has been filed in parent application, Serial No. 08/053,307, filed on April 23, 1993 as paper no. 28.

a. However, a review of that certified copy, which is in English, indicates that it does not support the present assertion of priority. Support is not found in that certified copy for the invention as presently claimed. See MPEP 201.13 et seq. and 201.14 et seq.

b. Applicants' arguments filed April 11, 1996, January 3, 1996, and September 29, 1995, paper nos. 53, 50, and 51, as well as the Affidavits filed September 29, 1995 and January 3, 1996, paper nos. 49 and 52, have been fully considered but they are not deemed to be persuasive. The applicants quote some passages out of the priority document and argue that the present claims are fully based that document. Nevertheless, that priority document is not deemed to provide basis for the following limitations found in the present claims:

i. The limitations "a composition including a transition metal, a rare earth or rare earth-like element, an alkaline earth element, and oxygen", as found in claim 86 (lines 2-4). The certified priority document may provide basis for the

Art Unit: 1105

formula $RE_2TM.O_4$ at p. 2, para. 4, but the claimed composition is deemed to be much broader than that formula.

ii. The limitation "non-stoichiometric amount of oxygen", as found in claim 86 (line 6). Basis may be seen for an oxygen deficit at p. 2, para. 4, but no such basis is seen for the more general limitation of "a nonstoichiometric amount of oxygen".

iii. The limitation "a composition exhibiting a superconductive state", as found in claim 88 (line 2), wherein the composition is a "(transition) metal oxide", as found in claims 24 (lines 1 and 2), 89 and 90. The certified priority document may provide basis for compositions of the formula $RE_2TM.O_4$, as discussed above, but "a composition", "metal oxide", or "transition metal oxide" is deemed to be much broader than the formula $RE_2TM.O_4$.

iv. The limitation "a copper-oxide compound", as recited in claim 96 (line 6). The certified priority document may provide basis for compositions of the formula $RE_2TM.O_4$, as discussed above, but "a copper-oxide compound" is not deemed to be equivalent to a composition of the formula $RE_2TM.O_4$. Basis is not seen in the certified priority document for "a copper-oxide compound" with the breadth of the present claims.

v. The limitation to the effect that "the copper oxide compound includes (including) at least one rare-earth or rare-earth-like element and at least one alkaline-earth element", as recited in claim 97 (lines 3 and 4) and claim 103 (lines 6-8). The certified priority document may provide basis for compositions of the formula $RE_2TM.O_4$, as discussed above, but basis is not seen for the more general limitation of "a copper-oxide compound" with a rare-earth (like) element and an alkaline earth element.

Art Unit: 1105

vi. The limitation to the effect that "the copper-oxide compound includes at least one element (oxygen) in a nonstoichiometric atomic proportion", as found in claim 101 (lines 2 and 3), 102 (lines 2 and 3), 107 (lines 2 and 3), and 108 (lines 2 and 3). Basis may be seen for an oxygen deficit as discussed above, but no such basis is seen for the more general limitation of "a nonstoichiometric atomic proportion".

vii. The limitation as to "the effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$ ", as found in claim 103 (lines 13, 16, and 17). The critical temperature, T_c , is discussed throughout that certified priority document, but not $T_{p=0}$.

Claim Rejections - 35 USC § 112

4. The specification is objected to under 35 U.S.C. § 112, *first paragraph*, as failing to provide an enabling disclosure commensurate with the scope of the claims.

a. The present specification is deemed to be enabled only for compositions comprising $Ba_xLa_{5-x}Cu_3O_y$. The art of high temperature (above 30°K) superconductors is an extremely unpredictable one. Small changes in composition can result in dramatic changes in or loss of superconducting properties. The amount and type of examples necessary to support broad claims increases as the predictability of the art decreases.¹ Claims broad enough to cover a large number of compositions that do not exhibit the desired properties fail to satisfy the requirements of 35 USC 112.² Merely reciting a desired result does not

¹See In re Fisher, 166 USPQ 18, 24; and In re Angstadt and Griffen, 190 USPQ 214, 218. See also, In re Colianni, 195 USPQ 150, 153, 154 (CCPA 1977) (J. Rich).

²See In re Cook, 169 USPQ 298, 302; and Cosden Oil v. American Hoechst, 214 USPQ 244, 262.

Art Unit: 1105

overcome this failure.³ In particular, the question arises: Will any layered perovskite material containing copper exhibit superconductivity? Also, does any stoichiometric combination of rare earth, an alkaline earth, and copper elements result in an oxide superconductor?

b. It should be noted that at the time the invention was made, the theoretical mechanism of superconductivity in these materials was not well understood. That mechanism still is not understood. Accordingly, there appears to be little factual or theoretical basis for extending the scope of the claims much beyond the proportions and materials actually demonstrated to exhibit high temperature superconductivity. A "patent is not a hunting license. It is not a reward for the search, but a reward for its successful conclusion".⁴

c. Claims 24-26, 86-90, and 96-108 are rejected under 35 U.S.C. § 112, *first paragraph*, for the reasons set forth in the objection to the specification.

d. Applicants' arguments filed April 11, 1996, January 3, 1996, and September 29, 1995, paper nos. 53, 50, and 51, as well as the Affidavits filed September 29, 1995 and January 3, 1996, paper nos. 49 and 52, have been fully considered but they are not deemed to be persuasive.

i. The additional caselaw and arguments by the applicants have been duly noted. For the reasons that follow, however, the record as a whole is deemed to support the initial determination that the originally filed disclosure would not have enabled one skilled in the art to make and use the invention to the scope that it is presently claimed.

³See In re Corkill, 226 USPQ 105, 1009.

⁴See Brenner v. Manson, 383 US 519, 148 USPQ 689.

Art Unit: 1105

ii. The applicants quote several passages from their specification at pp. 13-15 of their September 29, 1995 Amendment, but the issue is the scope of enablement, not support. The present disclosure may or may not provide support for particular embodiments, but the issue here is the scope to which that disclosure would have taught one skilled in the art how to make and use a composition which shows the onset of superconductivity at above 26°K.

iii. Construed in light of that issue, the invention is not deemed to have been fully enabled by the disclosure to the extent presently claimed.

(1) In their September 29, 1995 Amendment, the applicants argue that their disclosure refers to "the composition represented by the formula RE-TM-O, where RE is a rare earth or rare earth-like element, TM is a nonmagnetic transition metal, and O is oxygen", and list several species such as " $\text{La}_{2-x}\text{Ba}_x\text{CuO}_{4-y}$ " which they indicate are found in the present disclosure.

(a) Notwithstanding that argument, it still does not follow that the invention is fully enabled for the **scope** presently claimed. The claims include formulae which are much broader than the RE-TM-O formula cited in the disclosure. Claim 24 recites "a transition metal oxide", claim 88 "a composition", and claim 96 "a copper-oxide compound".

(b) The present specification actually shows that known forms of "a transition metal oxide", "a composition", and "a copper-oxide compound" do **not** show the onset of superconductivity at above 26°K. At p. 3, line 20, through p. 4, line 9, of their disclosure, the applicants state that the prior art includes a "Li-Ti-O system with superconducting onsets as high as 13.7°K." Official Notice is taken of the well-known fact that Ti is a transition metal. That disclosure also refers to "a second, non-conducting CuO phase" at p. 14, line 18.

(c) Accordingly, the present disclosure is not deemed to have been fully enabling with respect to the "transition metal oxide" of claim 24, the "composition" of claim 88, or the "copper-oxide compound" of claim 96.

(2) The examples at p. 18, lines 1-20, of the present specification further substantiates the finding that the invention is not fully enabled for the scope presently claimed.

(a) With a 1:1 ratio of (Ba, La) to Cu and an x value of 0.02, the La-Ba-Cu-O form (i.e., "RE-AE-TM-O", per p. 8, line 11) shows "no superconductivity".

(b) With a 2:1 ratio of (Ba, La) to Cu and an x value of 0.15, the La-Ba-Cu-O form shows an onset of superconductivity at " $T_c = 26^\circ\text{K}$ ". It should be noted, however, that **all** of the claims in this application require the critical temperature (T_c) to be "in excess of 26°K " or "greater than 26°K ".

(c) Consequently, the present disclosure is not deemed to adequately enable the full scope of the present claims. Independent claims 86 and 103 may require the presence of rare earth, alkaline earth, and transition metals, but the aforementioned examples show that superconductivity is still very unpredictable. Those claims cannot be deemed to be fully enabled.

iv. The applicants also have submitted three affidavits attesting to the applicants' status as the discoverers of materials that superconduct $> 26^\circ\text{K}$. Each of the affidavits further states that "all the high temperature superconductors which have been developed based on the work of Bednorz and Muller behave in a similar manner (way)". Each of the affidavits add "(t)hat once a person of skill in the art knows of a specific transition metal oxide composition which is superconducting above 26°K , such a person of skill in the art, using the techniques

Art Unit: 1105

described in the (present) application, which includes all known principles of ceramic fabrication, can make the transition metal oxide compositions encompassed by (the present) claims ...without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art." All three affiants apparently are the employees of the assignee of the present application.

(1) Those affidavits do not set forth particular facts to support the conclusions that all superconductors based on the applicants' work behave in the same way and that one skilled in the art can make those superconductors without undue experimentation. Conclusory statements in an affidavit or specification do not provide the factual evidence needed for patentability.⁵

(2) Those affidavits do not overcome the non-enablement rejection. The present specification discloses *on its face* that only certain oxide compositions of rare earth, alkaline earth, and transition metals made according to certain steps will superconduct at $> 26^{\circ}\text{K}$.

(3) Those affidavits are not deemed to shed light on the state of the art and enablement *at the time* the invention was made. One may know *now* of a material that superconducts at more than 26°K , but the affidavits do not establish the existence of that knowledge on the filing date for the present application. Even if the present application "includes all known principles of ceramic fabrication", those affidavits do not establish the level of skill in the ceramic art as of the filing date of that application.

(4) It is fully understood that the applicants are the pioneers in high temperature metal oxide

⁵See In re Lindner, 173 USPQ 356, 358 (CCPA 1972).

Art Unit: 1105

superconductivity. The finding remains, nonetheless, that the disclosure is not fully enabling for the scope of the present claims.

5. Claims 86-87 and 96-108 are rejected under 35 U.S.C. § 112, *second paragraph*, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The terms "layer-type", "perovskite-like", "rare-earth-like" are vague and confusing. The question arises: What is meant by these terms?

b. Applicants' arguments filed April 11, 1996, January 3, 1996, and September 29, 1995, paper nos. 53, 50, and 51, as well as the Affidavits filed September 29, 1995 and January 3, 1996, paper nos. 49 and 52, have been fully considered but they are not deemed to be persuasive.

i. The terms "layer-type" and "perovskite-like" are unclear because the "type" or "like" terms are deemed to be indefinite. Terms such as "like", "similar", and "type" are indefinite.⁶ It is suggested that "layer-type perovskite-like crystal structure" be changed -- a substantially layered perovskite crystal structure --.

ii. The applicants respond that "(a) person of skill in the art would understand (rare earth-like) to mean that a location occupied by a rare earth element can also be occupied by another element which would have chemical properties similar enough to the rare earth elements such that it would fit in to the latter (sic - lattice?) site occupied by the rare earth element." That response does not alleviate the problem, however.

⁶See Ex parte Remark, 15 USPQ 2d 1498, 1500 (BPAI 1990); Ex parte Kristensen, 10 USPQ 2d 1701, 1703 (BPAI 1989); Ex parte Attig, 7 USPQ 2d 1092, 1093 (BPAI 1988); and Ex parte Copenhaver, 109 USPQ 118 (POBA 1955).

Art Unit: 1105

Other elements may "fit" into the lattice but they may not necessarily be "rare-earth-like". It is suggested that the same language be changed to -- Group III B --, per p. 7, line 11, of the present specification.

Claim Rejections - 35 USC § 102

6. Claims 24-26, 86-90, and 96-108 are rejected under 35 U.S.C. § 102(a) as being anticipated by Asahi Shinbum, International Satellite Edition (London), November 11, 1986 (hereinafter, "the Asahi Shinbum article").

a. As discussed in paper no. 20 of the ancestral application, 07/053,307, it is not fully clear to what exact date applicants are entitled. Based on the record, nonetheless, that date would appear to be no later than around December 13, 1986, the date samples were tested in the US to show superconductivity. See MPEP 715 et seq. The Asahi Shinbum article was published on November 28, 1986.

b. The reference confirms superconductivity in an oxide compound of La and Cu with Ba having a structure of the so-called perovskite structure. Although the reference fails to teach use of the testing of zero resistance for confirming superconductivity, it inherently must have been used because it is one of two methods used for testing for superconductivity (the other being diamagnetism). Accordingly, the burden of proof is upon the applicants to show that the instantly claimed subject matter is different from and unobvious over that taught by this reference.⁷

c. Applicants' arguments filed April 11, 1996, January 3, 1996, and September 29, 1995, paper nos. 53, 50, and 51, as well as the Affidavits filed September 29, 1995 and January 3, 1996,

⁷See In re Brown, 173 USPQ 685, 688; In re Best, 195 USPQ 430; and In re Marosi, 218 USPQ 289, 293.

Art Unit: 1105

paper nos. 49 and 52, have been fully considered but they are not deemed to be persuasive.

i. The applicants argue that the Sung II Park Affidavit of March 30, 1988 states at para. 4 that measurements were taken of a superconductive sample on or before November 9, 1986, to the best of the affiant's recollection, or no later than November 15, 1986. The documentary evidence is not deemed to support that argument, however. See MPEP 715.07.

(1) Plots of those measurements are missing. See the Chang C. Tsuei Affidavit of March 30, 1988, para. 6. A hand-drawn diagram with the indication of vacuum pumping on November 9, 1988 also is not deemed to show that the measurements were taken.

(2) Moreover, the other evidence in the record appears to show that high temperature superconductivity was not attained in this country as of November 9 or 15, 1986. The March 30, 1986 Declaration of Richard L. Greene includes a series of cablegrams sent by Dr. Greene to the applicants in Zurich, Switzerland as Exhibit B. On both November 11, 1986 and November 14, 1986, Dr. Greene reports that no indication of superconductivity has been seen in his specific heat measurements for temperatures of 4-35°K. Exhibit C has pages dated December 1, 1986 on, and Exhibit D, which actually has plots of resistance vs. temperature, has an earliest date of December 3, 1996.

ii. The applicants assert that the Asahi Shinbum article reports a third party's confirmation of their original discovery. That assertion appears to be correct, but the article still is deemed to be prior art under 35 USC 102(a).

(1) It should be noted again, however, that the applicants' discovery was not originally made in this country and that they cannot show an earlier date than December 1986 for their invention in this country. The Asahi Shinbum article was published on November 28, 1986.

(2) The applicants cite four decisions⁸ which do not directly apply to the present facts.

(a) The In re Katz⁹ decision held that an applicant may overcome an article as 35 USC 102(a) prior art by showing that the applicant was a co-author and that the other co-authors were under the direction and control of the applicant. Here, however, the applicants were neither co-authors in the Asahi Shinbum article nor did they exercise direction and control over the work reported in that article.

(b) The Andrews v. Hovey¹⁰ decision involved a grace period which is now codified in 35 USC 102(b). The present case involves a printed publication as prior art under 35 USC 102(a).

(c) The Ex parte Powell and Davies¹¹ decision held that an applicant's own foreign patent which issued within the grace period cannot be used against him or her, and the Ex parte Lemieux¹² decision applied that reasoning to an applicant's own article published in another country. Again, the present applicants had no part in the writing of the Asahi Shinbum article.

⁸One decision is cited in the January 4, 1996 Supplementary Response, paper no. 51: In re Katz, 215 USPQ 14 (CCPA 1982). Three decisions are cited in the April 11, 1996 Supplementary Response, paper no. 53: Andrews v. Hovey, 123 US 267 (1887); Ex parte Lemieux, 115 USPQ 148 (POBA 1957); and Ex parte Powell and Davies, 37 USPQ 285 (POBA 1938).

⁹See In re Katz, *supra*, 215 USPQ at 17, 18. See also, MPEP 716.10.

¹⁰See Andrews v. Hovey, *supra*.

¹¹See Ex parte Powell and Davies, *supra*, 37 USPQ at 285, 286.

¹²See Ex parte Lemieux, *supra*, 115 USPQ at 149. See also, MPEP 715.01(c).

Art Unit: 1105

(3) The present facts may raise a novel issue of law.¹³ The applicants were the first to develop the presently claimed invention, but the earliest date they can show for that invention in this country is December of 1986.¹⁴ The Asahi Shinbum article was published in November of 1986 and describes the development of superconductivity with an oxide of La, Ba, and Cu having a perovskite structure by a third party, but that article apparently indicates that the third party was confirming the discovery of the present applicants. Notwithstanding the possible uniqueness of the present facts, however, the Asahi Shinbum article still is deemed to be prior art under 35 USC 102(a), which the applicants have not been able to overcome with a showing of an earlier date in this country or a showing of their direction and control over the work done by that third party.

Claim Rejections - 35 USC § 103

7. Claims 24-26, 86-90, and 96-108 are rejected under 35 U.S.C. § 103 as being unpatentable over the Asahi Shinbum article.

a. The reference is relied upon as set forth in the previous rejection. This reference may differ from the present claims in that it may fail to disclose the presently claimed method of "causing an electric current to flow in the superconductor element". It was notoriously well-known in the art of superconductors that a method of utilizing superconductive

¹³The applicants did not cite In re Mathews, 161 USPQ 276, 277-279 (CCPA 1969), which held that an applicant may overcome a patent as prior art under 35 USC 102(e) with evidence that the applicant provided the knowledge for the disclosure in that patent. By contrast, the present facts involve prior art under 35 USC 102(a) with a publication date **before** the invention was in this country.

¹⁴The applicants' proposed priority date for the EPO application is January 23, 1987, which is after the December 1986 dates show by the Richard L. Greene Affidavit.

materials was to cause an electric current to flow in the material while it is cooled below its transition temperature. See MPEP 706.02(a). Accordingly, it would have been well within the purview of one of ordinary skill to use the present claimed method with the materials disclosed by the reference. One would have been motivated to cool the material of the reference to below the transition temperature and cause electric current to flow in the material to provide electricity without resistance. Accordingly, the present claims are unpatentable in view of the prior art of record.

b. Applicants' arguments filed April 11, 1996, January 3, 1996, and September 29, 1995, paper nos. 53, 50, and 51, as well as the Affidavits filed September 29, 1995 and January 3, 1996, paper nos. 49 and 52, have been fully considered but they are not deemed to be persuasive. The Asahi Shinbum article is deemed to be prior art under 35 USC 102(a) for the reasons discussed above.

Possibly Allowable Subject Matter

8. It is noted that the applicants were awarded the Nobel Prize for their work in this area. The record is not deemed to indicate, however, that the Asahi Shinbum article was predicated by the applicants' earlier conception and/or reduction to practice *in this country*. The presently claimed invention also is non-enabling and indefinite for the reasons set forth above.

9. To possibly overcome the above rejections, the following amendments are suggested:

a. 109 (New). A method comprising the steps of:

forming a composition of the formula $Ba_xLa_{5-x}Cu_3O_y$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which

exhibits a superconducting state at a critical temperature in excess of 26°K;

maintaining the temperature of said composition at a temperature less than said critical temperature to induce said superconducting state in said metal oxide phase; and

passing an electrical current through said composition while said metal oxide phase is in said superconducting state.

b. Cancel claims 24-26, 86-90, and 96-108.

10. The following is an Examiner's statement of reasons for the indication of possibly allowable subject matter:

a. The Asahi Shinbum article teaches in general that perovskite-like compounds of La, Cu, and Ba have a T_c of 30°K, but that article apparently does not teach the particular formula in the amendment suggested above. The examples in the present specification are deemed to show criticality for that formula in that suggested amendment.

b. Support for the proposed amendment is found at p. 20, line 1, through p. 25, line 5, and in Figure 3.

Serial Number: 08/303,561

-16-

Art Unit: 1105

c. This indication of possibly allowable subject matter is subject to further consideration and review.

Conclusion

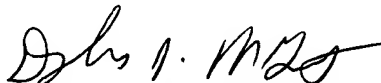
11. Any amendment in response to this Office Action must NOT include any new matter. See MPEP 608.04 and 706.03(o).

12. The applicant or applicants is or are reminded that any evidence to be presented in accordance with 37 CFR 1.131 or 1.132 should be submitted before final rejection in order to be considered timely.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas J. McGinty, whose telephone number is (703) 308-3805. The examiner normally can be reached on Monday through Friday from 8:30 A.M. to 5:00 P.M., Eastern time. If reasonable attempts to reach the examiner by telephone are unsuccessful, however, the examiner's supervisor, Mr. Paul Lieberman, can be reached at (703) 308-2523. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

14. The fax number for this Group is (703) 305-3600.

April 12, 1996
303561.2


Douglas J. McGinty
Primary Examiner
Group 1100